Missouri Department of Natural Resources

Total Maximum Daily Load Information Sheet

Salt River

Waterbody Segment at a Glance:

County: Ralls, Pike
Nearby Cities: Stoutsville, Paris
Length of impairment: 39 miles
Pollutants: Low Dissolved Oxygen, Iron, Manganese
Source: Cannon Dam


State map showing location of watershed

Salt River is being added to the 2002 303(d) list for Low Dissolved Oxygen and Mercury and is being retained for Iron and Manganese. See Mercury Information Sheet

TMDL Priority Ranking: Medium

Description of the Problem

Beneficial uses of Salt River

- Livestock and Wildlife Watering
- Protection of Warm Water Aquatic Life and Human Health associated with Fish Consumption
- Irrigation
- Drinking Water Supply
- Whole Body Contact
- Boating and Canoeing

Use that is impaired

- Protection of Warm Water Aquatic Life
- Drinking Water Supply

Standards that apply

- The Missouri Water Quality Standard (WQS), found in 10 CSR 20-7.031 Table A, for dissolved oxygen in streams is 5.0 mg/L (milligrams per liter or parts per million).
- Missouri Water Quality Standards for metals found in 10 CSR 20-7.031(4)(B)1. state: "Water contaminants shall not cause the criteria in Tables A and B to be exceeded. Concentrations of these substances in bottom sediments or waters shall not harm benthic organisms and shall not accumulate through the food chain in harmful concentrations, nor shall state and federal maximum fish tissue levels for fish consumption be exceeded." The maximum

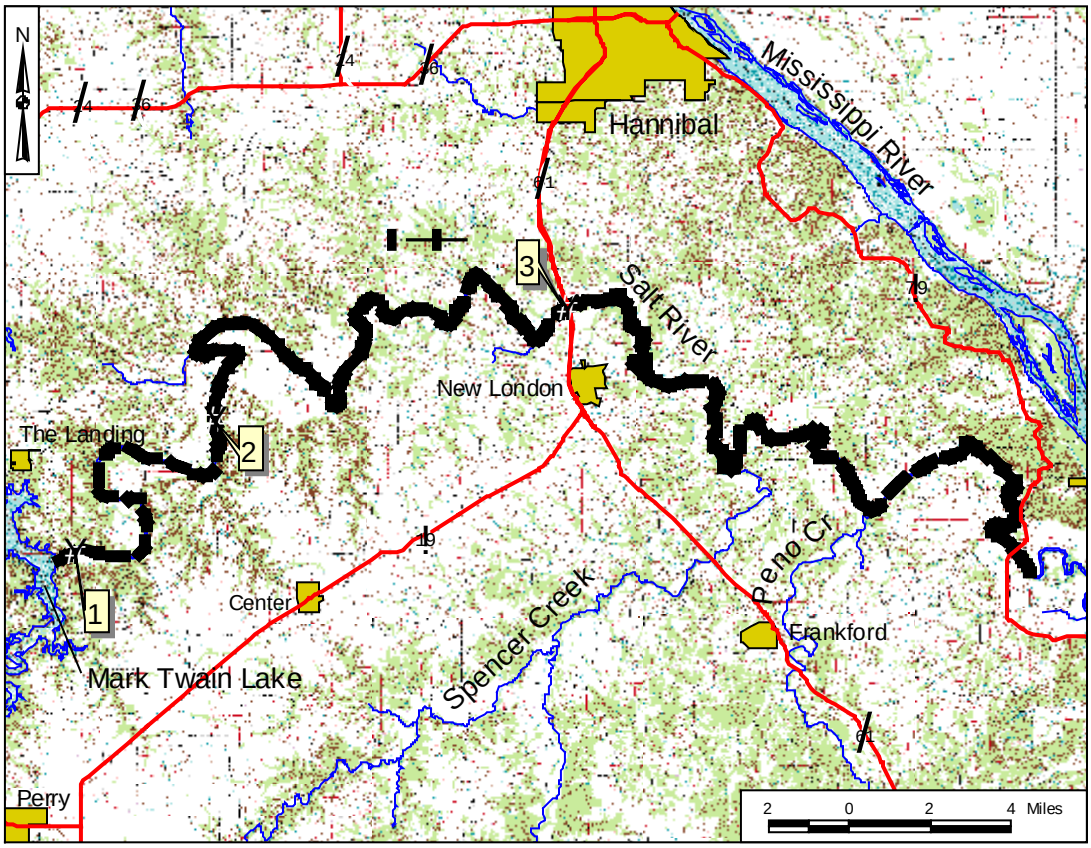
for iron in drinking water is 300 µg/L and 1000 µg/L for protection of aquatic life. The maximum for manganese in drinking water is 50µg/L.

Thermal stratification occurs in all large reservoirs in Missouri. In summer, this stratification results in the warmer surface waters not mixing with the cooler deeper waters of the lake. This means that deeper waters are not resupplied with oxygen from the atmosphere. Over the course of the summer, these waters lose dissolved oxygen (DO) as fish and other aquatic life consumes it. Electrical power generation often uses lake water low in dissolved oxygen. When this water flows through the turbines, it is discharged to Salt River with very little dissolved oxygen. Exposure to the air while in Salt River gradually raises the dissolved oxygen level. The Army Corps of Engineers has conducted water quality monitoring of Salt River just downstream of the Re-regulation Dam, ten miles downstream of Cannon Dam. Since 1987, DO levels have ranged from 3.0 to 12.5 mg/L and 11 percent of the observations have been below the 5 mg/L water quality standard.

Corps of Engineers monitoring has also shown average total manganese of 171 µg/L (micrograms per Liter, or parts per billion) and average total iron of 1294 µg/L just downstream of the re-regulation dam. Within the re-regulation pool, average total manganese was 96 µg/L and average total iron was 952 µg/L. While state water quality standards are for dissolved rather than total metal, low DO water exiting Cannon Dam usually has iron and manganese primarily in the dissolved form. Manganese tends to remain in solution for extended periods of time even after the water regains oxygen. Iron does not. Thus, these data suggest exceedences of state standards for manganese in both the re-regulation pool and the Salt River downstream of the regulation pool and for iron within the re-regulation pool.

Iron and manganese are common metallic elements found in soil and rocks. As water flows through iron and manganese-rich soils, these elements can get into the ground water supply. Iron and manganese do not present any human health hazards. These minerals can react with tannins in coffee, tea and in other beverages, producing a black sludge, which affects both taste and appearance. Iron causes a reddish-brown staining of laundry, porcelain, dishes, utensils and glassware. Manganese causes a brownish-black staining of the same articles. Soaps and detergents do not remove the stains, and use of chlorine bleach can intensify the stains. Iron and manganese can build up in pipelines, pressure tanks, water heaters and water softeners and causes equipment problems and energy cost increases due to mineral deposits.

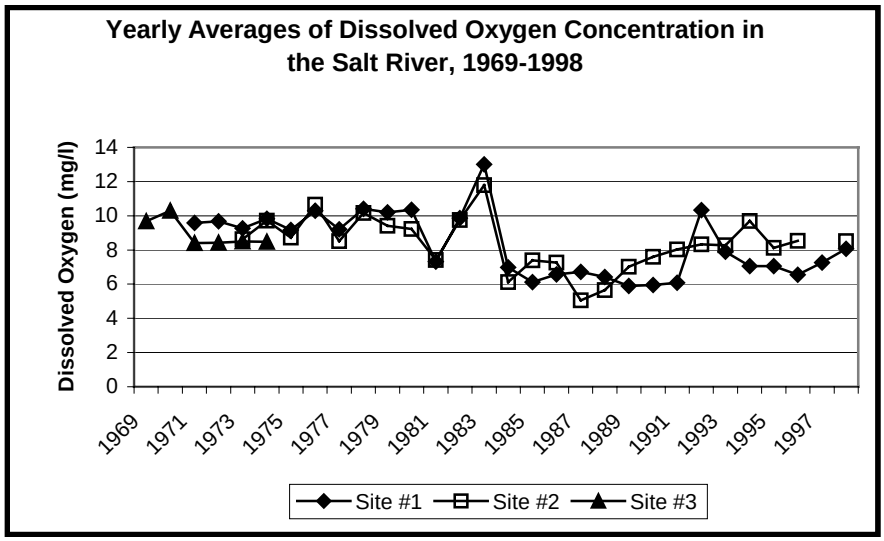
Map of Impaired Segment of Salt River Showing Sampling Sites



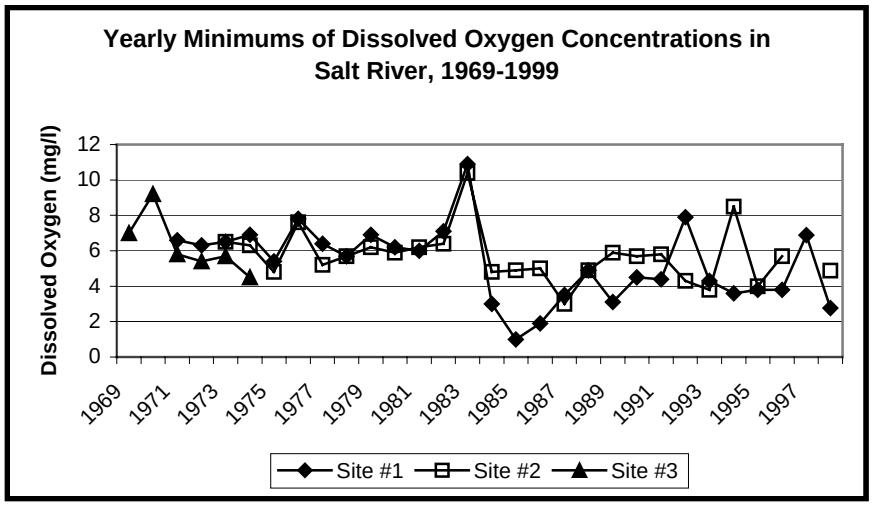
Impaired Segment → Direction of Flow

Site Index

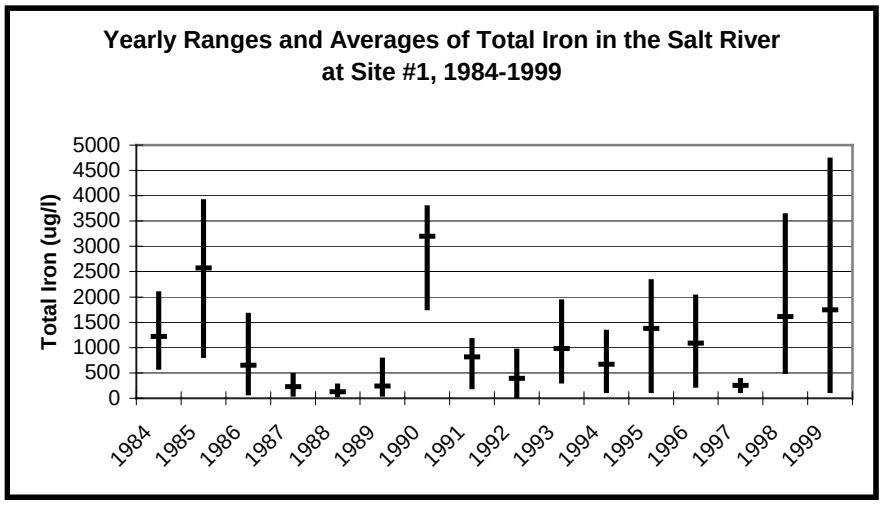
1 – Salt River below Clarence Cannon Dam
2 – Salt River below re-regulation dam
3 – Salt River near New London



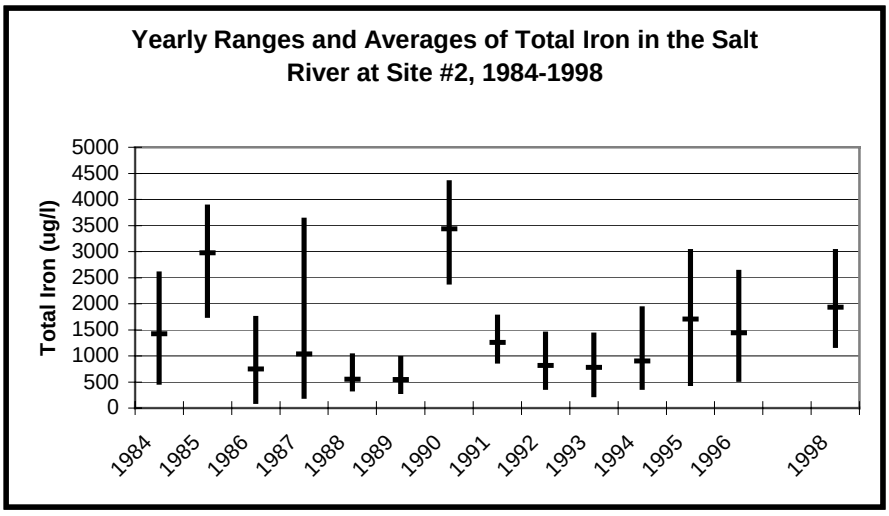
Sources: U.S. Army Corps of Engineers, U.S. Geological Survey



Sources: U.S. Army Corps of Engineers, U.S. Geological Survey



Source: U.S. Army Corps of Engineers



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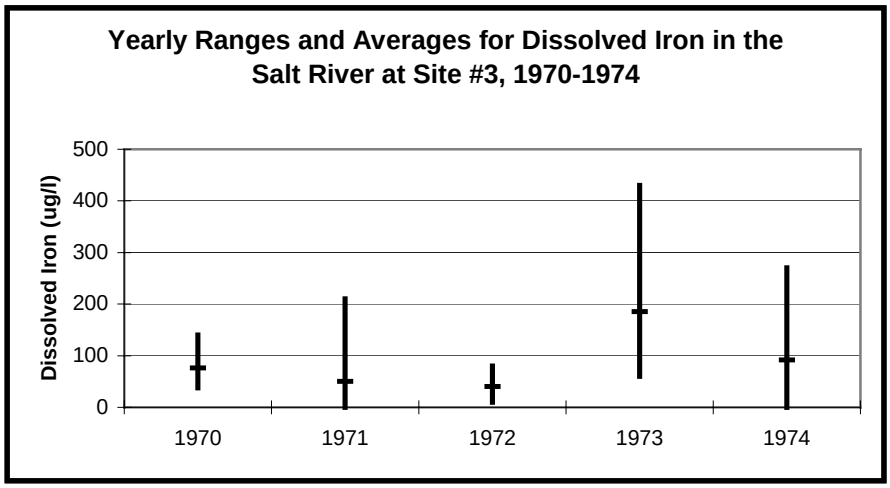
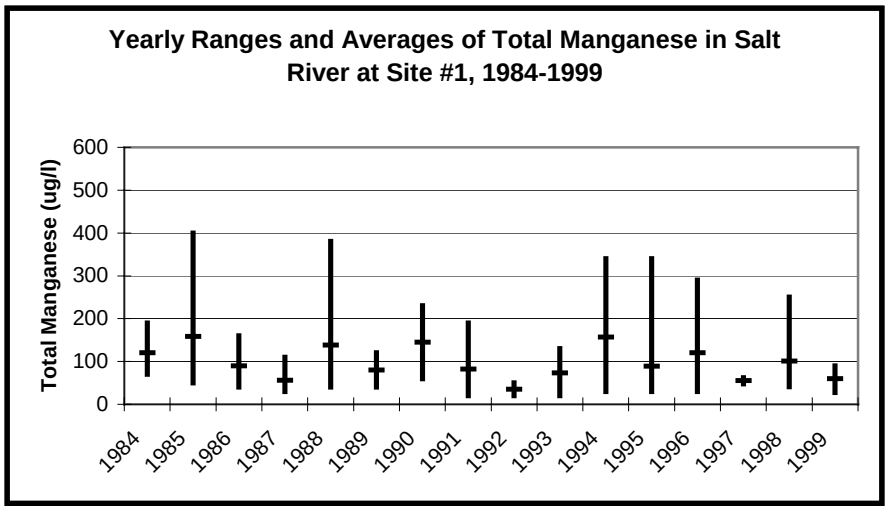


Source: U.S. Geological Survey



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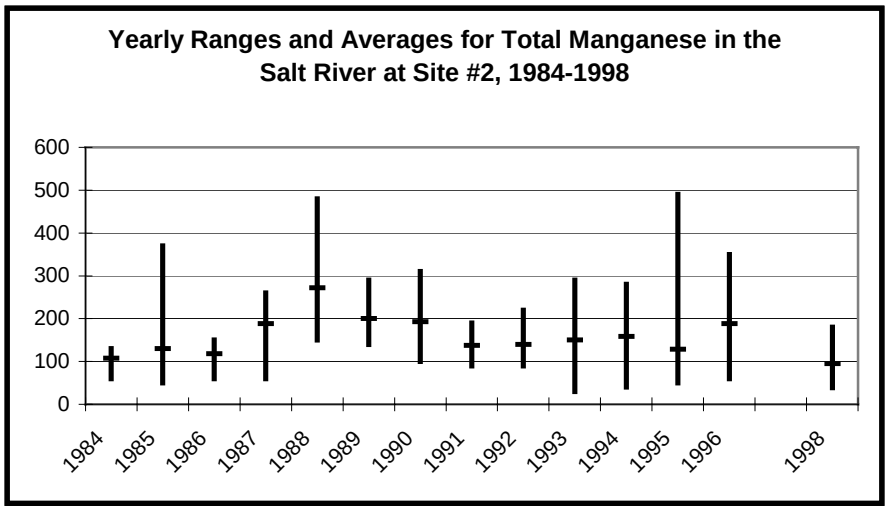

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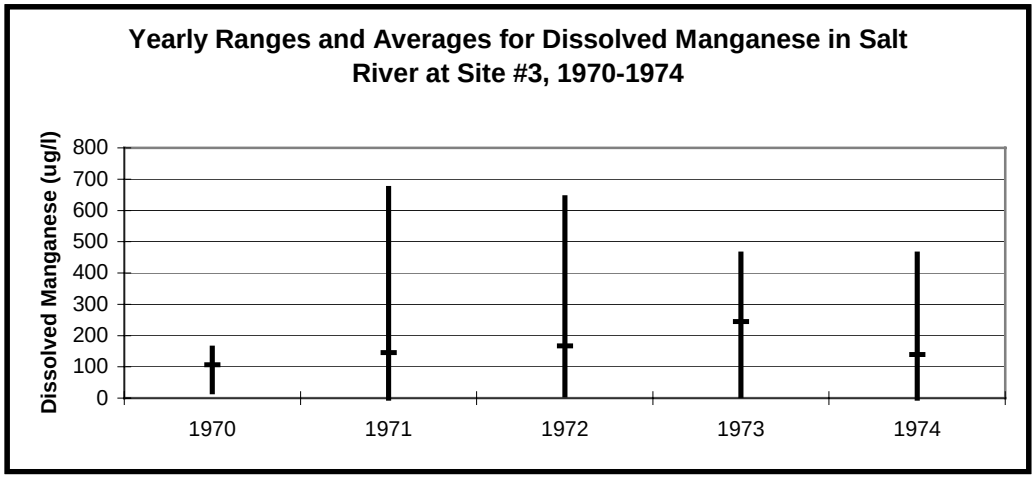

Source: U.S. Geological Survey

For more information call or write:

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